Weekly Report (2017.8.7-2017.8.13)

Done

1) Paper Reading: A Five-Level Design Framework for Bicluster Visualization. This paper presents a five-level design framework for bicluster visualizations, makes a survey of the state-of-the-art design considerations and applications that are related or that can be applied to bicluster visualizations.

Table 2. Summary of the Five-level Design Framework for Bicluster Visualizations

Relations	Major Tasks	Design Choices			Pros	Cons
		Visual Representation	Supplementary Visual Technique	Interaction Design		
Entity Level	1. Show an entity 2. Show a group of entities 3. Show entity level relations (a single case or multiple cases) 4. Show single entity vs. groups of entities level relations (a single case or multiple cases) 5. Find relevant entities for a specific entity 6. Verify relations between some entities 7. Discriminate some entities from others 8. Mark important entities or relations	The Node-Link Diagram	1. Edge bundling 2. Use spatial distance (e.g. the force-directed layout) 3. Use spatial distance + hiding links 4. Color coding to separate nodes of different domains or selected and unselected nodes or links 5. Visual marks (e.g., shapes) to separate nodes and/or links	1. Select nodes/links 2. Highlight nodes/links 3. Drag nodes/links	1. An intuitive way to show either an entity or multiple entities and relations between entities 2. Customizable spatial layout for users 3. Links clearly show specific relations between entities	1. Entities are randomly placed in the space, so it may be difficult to find an entity if there are many entities 2. The number of links exerts much impact on the readability of the diagram 3. Without links, relations between entities cannot be identified easily 4. Color coding and visual marks are not efficient to visually separate domains
		A Simple Matrix	1. A single cell to represent Entity 2. A row or a column to represent Group 3. Use a heatmap	1. Select cells 2. Highlight cells 3. Extract a cell 4. Merge cells	Avoid visual clutters caused by too many links	1. Not as easy as node-link diagrams to perceive 2. Columns or rows rearrangement is the only way to change the layout
		Parallel Coordinates with Two Domains	1. Edge bundling 2. Using curved lines to indicate links	1. Select entities 2. Highlight polylines/entities 3. Brushing 4. Axes rearrangement 5. Entities reposition in axes	1. Place entities of the same group together 2. Relatively easy to find entities 3. Efficiently select multiple entities/polylines	1. The number of links exerts much impact on the readability of the diagram 2. Without links, relations between entities cannot be identified easily 3. Sometimes entity reposition (e.g., moving relevant entities to the top) is necessary to understand grouping
Group Level		Tree Visualizations	1. Icicle 2. Bubble trees 3. Treemaps	1. Select nodes/links 2. Highlight nodes/links 3. Path extraction	Clearly represent hierarchical relations	1. Not all Groups are hierarchical relations 2. Cannot represent biclusters and bicluster-chains
Bicluster Level	1. Show a bicluster 2. Show all biclusters 3. Find biclusters of interest 4. Mark biclusters of interest	Matrices	1. Use a heatmap 2. Reorder rows or columns 3. Repeat rows or columns 4. Color coding the region of a bicluster	1. Reorder rows/columns 2. Select biclusters 3. Highlight biclusters 4. Replicate rows/columns	1. A visual representation that is easy to understand biclusters 2. Efficiently reduce visual clutters caused by many links	1. It is difficult to display all biclusters without replicating rows and/or columns 2. Replicated rows or columns may cause confusion 3. Overlaps may obscure biclusters with less entities
		Parallel Coordinates with Two Domains	1. Edge bundling 2. Use curved lines 3. Wrap entities with polylines 4. Tile-based parallel coordinates	1. Select entities 2. Brushing 3. Highlight polylines/entities/ribbons 4. Axes rearrangement 5. Entities reposition in axes	1. Place entities of the same group together 2. Relatively easy to find entities 3. Efficiently select multiple entities/polylines	1. The number of links exerts much impact on the readability of the diagram 2. Without links, relations between entities cannot be easily identified 3. Sometimes entity reposition (e.g., moving relevant entities to the top) is necessary to understand the relation
		Zoned Node-Link Diagram	1. Wrap nodes of a bicluster in a colored region 2. Use force-directed layout 3. Hide links between nodes	1. Select nodes/links 2. Highlight nodes/links 3. Drag nodes/links	1. Customizable spatial layout for users 2. Links clearly show relations between specific entities 3. Easily find entities that are shared between biclusters	1. Entities are randomly placed in the space, so it may be difficult to find an entity if there are many entities 2. Without links, relations between entities cannot be identified easily 3. Biclusters with less entities may be obscured in the overlapping region
Chain Level	1. Show a chain 2. Show all chains 3. Find chains of interest 4. Mark chains of interest	Node-link Diagram + Matrices	Combine all supplementary visual techniques that the node-link diagram and matrix based visualizations can use and the Bubble Sets technique	Combine all interactions that the node-link diagram and matrix based visualizations can use and path extraction	1. Efficiently reduce the number of links 2. A customizable spatial layout for users 3. Show the overview of the data based on bicluster-chains 4. By following links, users can find out how a bicluster-chain is formed	1. Entities may replicate many times in multiple matrices 2. Not a trivial visualization for users to understand connections across several biclusters 3. Which bicluster to choose to start a bicluster-chain is a problem
		Parallel Coordinates + Matrices	Combine all supplementary visual techniques that parallel coordinates and matrix based visualizations can use and the Bubble Set technique	Combine all interactions that parallel coordinates and matrix based visualizations can use and path extraction		
Schema Level	1. Show the overview of a dataset 2. Guide the exploration of chains or biclusters	The Node-Link Diagram	1. Clutter Map 2. The PivotGraph technique 3. Color coding to indicate different domains 4. Visual marks (e.g., shapes) to separate nodes and/or links 5. Use spatial distance (e.g. force-directed layout) 6. Use spatial distance + hiding links	1. Select nodes/links 2. Highlight nodes/links 3. Dynamic path extraction	1. An intuitive way to show relations between domains 2. The size of nodes and the thickness of links can be used to encode the information of biclusters and/or chains	1. The layout of PivotGraph cannot be easily changed by users 2. Depend on links to perceive relations across several specific domains.
		The Chord Diagram	1. Color coding of chords to indicate different domains 2. Use ribbons between chords to indicate connections	1. Select chords/ribbons 2. Highlight chords/ribbons	1. An intuitive way to show relations between domains 2. The length of chords and the thickness of ribbons can be used to encode the information of bicluster and/or chains	1. Not efficient for a dataset with many domains 2. Ribbons inside the diagram may form visual clutters 3. Paths inside the diagram may be obscured by too many crossing ribbons

2) Designed display of LAN tree structure, design a structure of pine tree instead of origional spreading structure. Pine tree structure can be abstracted to a tree structure growing from bottom to top with plain layers. Root node is placed at the bottom and children nodes grows topward.

The nonuniformity of data can be fully expressed by the feature of pine trees' growth, such as Guest-Greeting Pine, which grows irregularly.

The structure of pine tree can be more comprehensible than the formal tree structure, and the meaning of data can be expressed better. In terms of expression of multi-domain structure, we can draw paratactic trees.

3) Try to understand the implementation of bottom-top-tree using D3.js - version 4, and didn't implement yet.
4) Passport and VISA are required to attend the VIS conference, what's worse, I was told that my residence identity cannot be settled yet until 16th Sep, after consulted dozens of offices. I'm afraid that I can't attend this conference this time.
5) Extracted my last wisdom tooth.
6) Wasted a lot of time in puzzle game, 《Games Of Throne》 and baking, and did't do much of the project. There are still many things to do, I need to push myself to accelerate my efficiency and avoid of external attractions.

To Do

1) Do more about the project and do less things unrelated to work.